**Avaya Solution & Interoperability Test Lab**

# Application Notes for Extreme Networks BlackDiamond 8810 PoE Module with Avaya 4600 Series IP Telephones and Avaya Wireless Access Points - Issue 1.1

## Abstract

These Application Notes describe how to configure the Power over Ethernet module of the Extreme Networks BlackDiamond 8810 to provide inline power for Avaya 4600 Series IP telephones and Avaya Wireless Access Points. The various Avaya powering arrangements are shown and the administration commands for displaying and controlling the powering status of the switch ports are demonstrated. All test cases completed successfully. Information in these Application Notes has been obtained through compliance testing and additional technical discussions. Testing was conducted via the Developer*Connection* Program at the Avaya Solution and Interoperability Test Lab.


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# 1. Introduction

Power over Ethernet (PoE) is a feature offered on Ethernet switches. It allows the switch to supply power to a network device within the same cable that carries the Ethernet signaling. This simplifies network installation and powering design, removing the need for a separate power supply for a network device. IEEE 802.3af defines a standard protocol to be used by power sourcing equipment (PSE) and powered devices (PD). The PoE module of the Extreme Networks BlackDiamond 8810 is IEEE 802.3af compliant and can provide inline power to the Avaya 4600 Series IP telephones and Avaya Wireless Access Points, which are IEEE 802.3af compliant PDs.

The Avaya product configurations addressed by these Application Notes are shown in **Figure 1**. The following Avaya products are directly connected to the switch:

- Avaya 4601 IP telephone
- Avaya 4602 and 4602SW IP telephones
- Avaya 4602SW SIP telephone
- Avaya 4610SW IP telephone
- Avaya 4620 IP telephone with and without EU24
- Avaya 4620SW IP telephone with and without EU24
- Avaya 4630SW IP telephone
- Avaya Gen-2 4606, 4612, and 4624 IP telephone
- Avaya Wireless AP-4 /5/6 802.11a/b/g Access Points

The Avaya Gen-1 4612 and 4624 IP telephones require the Avaya 30A Switch Base. **Figure 2** shows the connections for the 30A switch base. The Avaya 4612 and 4624 telephones can be identified as Gen-1 or Gen-2 by inspecting the model number. "1A" in the model number indicates Gen-1; "2A" indicates Gen-2. The model number can be found by:

- Inspecting the label attached to the bottom of the telephone.

**OR**

- Pressing **Mute**, **V**, **I**, **E**, **W, #** on the keypad and then pressing ***** until the model number appears. Press **#** to exit.

Examples of model numbers are "4612D0**1A**-003" (Gen-1) and 4612D0**2A**-003 (Gen-2).

The powering tests included verification of the following after the product was connected to the switch:

- Successful boot operation
- For Avaya IP telephones, successful registration with Avaya Communication Manager and completion of a test call


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- For wireless LAN access points, successful registration for an Avaya IP Softphone with an Avaya Communication Manager and completion of a test call.

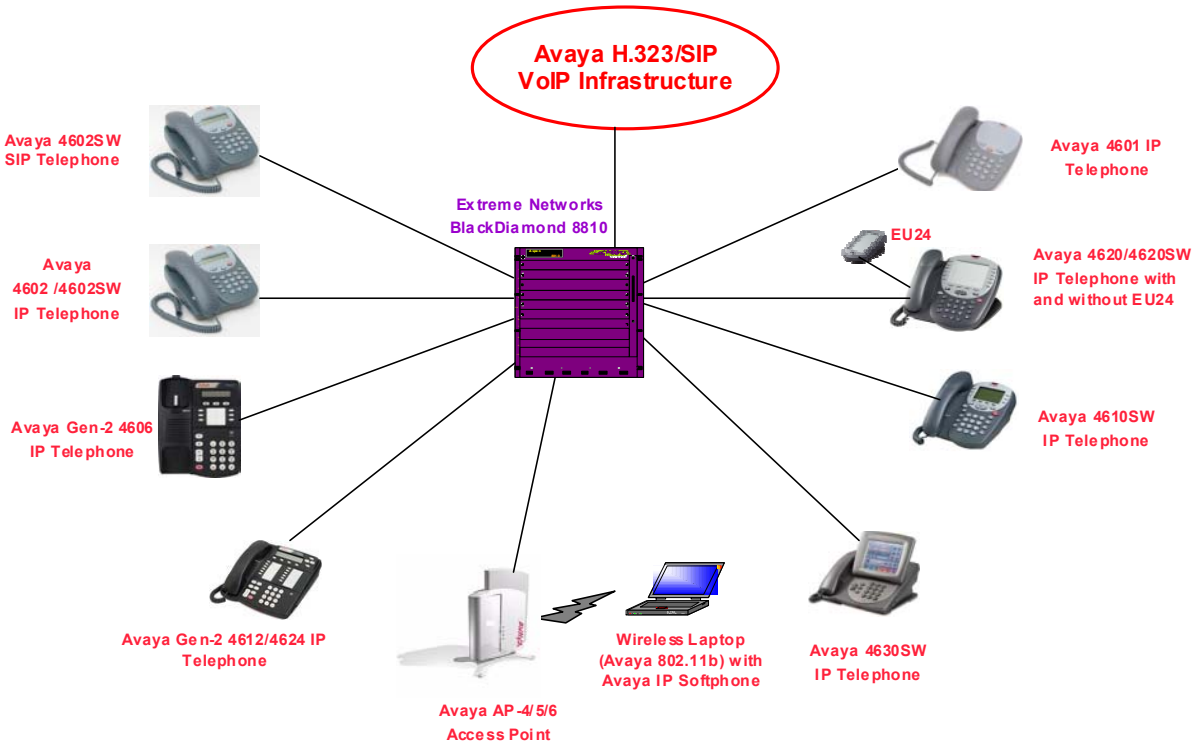


**Figure 1: Avaya 4600 Series IP Telephone and Wireless Access Point Configurations with the Extreme Networks BlackDiamond 8810**

**Figure 2: Avaya 30A Switch Base Connections**


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## 2. Equipment and Software Validated

The following equipment and software were used for the sample configuration provided:

| Network Component | Software Version |
|---|---|
| Avaya 4601 IP telephone | 1.8.2 |
| Avaya 4602SW telephone | 1.8.2 |
| Avaya 4602 IP telephone | 1.8.2 |
| Avaya 4602SW SIP telephone | 1.1 |
| Avaya 4606 Gen-2 IP telephone | 1.8.3 |
| Avaya 4612 Gen-2 IP telephone | 1.8.3 |
| Avaya 4624 Gen-2 IP telephone | 1.8.3 |
| Avaya 4610SW IP telephone | 2.1.3 |
| Avaya 4620 IP telephone | 2.1.3 |
| Avaya 4620SW IP telephone | 2.1.3 |
| Avaya 4630SW IP telephone | 2.0.1 |
| Avaya IP Softphone | 5.1.4.6 |
| Avaya AP-4/5/6 a/b/g Wireless Access Point | V.2.4.5 (758) |
| Extreme BlackDiamond 8810 Switch<br>G48P PoE Module | 11.1.1.9 |

**Table 1 - Network Component Software Versions**

## 3. IEEE 802.3af PoE Implementation on the Avaya PDs and Extreme Networks PSE

In June 2003, the IEEE approved a standard for Power over Ethernet. The maximum power is 16.8 Watts per PSE port. Optionally, powered devices may also be classified based on the maximum power the powered device will draw. Extreme Networks PSEs and Avaya PDs support this optional classification. The Extreme Networks BlackDiamond 8810 can detect the Avaya PDs and deliver the max power based on the classification shown in **Table 2**.

The IEEE 802.3af classifications for the PSE and PD are given in **Table 2**.

| Class | PSE Output Max. Power |
|---|---|
| 0 | 15.4W |
| 1 | 4.0W |
| 2 | 7.0W |
| 3 | 15.4W |
| 4 | Treat as Class 0 |

**Table 2 - IEEE 802.3af PSE and PD Power Classifications**


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**Table 3** shows the detected class, maximum allowed power, and measured power by the Extreme Networks BlackDiamond 8810 Switch for the Avaya IP telephones and Wireless Access Points. The power was measured when the powered devices were idle.

| Avaya IP Telephone | Class | Max Allowed Power (Watts) | Power Consumption (Watts) |
|---|---|---|---|
| 4601 | 2 | 7.0 | 3.1 |
| 4602 | 1 | 4.0 | 3.1 |
| 4602 SW | 2 | 7.0 | 3.2 |
| 4610 SW | 2 | 7.0 | 3.3 |
| 4620 | 3 | 15.4 | 6.8 |
| 4620 with EU24 | 3 | 15.4 | 7.6 |
| 4620 SW | 3 | 15.4 | 5.2 |
| 4620 SW with EU24 | 3 | 15.4 | 5.9 |
| 4630 SW | 3 | 15.4 | 10.6 |
| Gen-2 4606 | 0 | 15.4 | 4.7 |
| Gen-2 4612 | 0 | 15.4 | 5.0 |
| Gen-2 4624 | 0 | 15.4 | 5.0 |
| 4602SW SIP | 2 | 7.0 | 3.1 |
| Avaya AP-4/5/6 | 0 | 15.4 | 6.0 |

**Table 3 - Class, Power Allocation and Power Measured for Avaya IP Telephone and Wireless Access Points**

The following describes how the Extreme Networks BlackDiamond 8810 interacts with powered devices.

1. In order for any port to supply inline power, the system, slot and port must be enabled for power. Auto detection is enabled for all ports by default.

2. The power is reserved for each slot. The reserved power is configurable. The switch measures the total power consumption of a slot in real time to decide if there is power available for the next added device. The switch does not reserve the power for a detected PD.

3. The Extreme Networks BlackDiamond 8810 can detect Avaya PDs with the correct classifications as shown in **Table 3**. The switch will deny power to the PDs exceeding the class limit (**Max Allowed Power** in **Table 3**).

The G48P PoE module on the BlackDiamond 8810 supports 48 10/100/1000 ports.

The BlackDiamond 8810 supports configuration and control of the power for PoE at the system, slot and port levels. The BlackDiamond 8810 does not allow delivery of more power than is


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available. The system shares power among ports on a slot and automatically ensures the slot power budget is not exceeded.

The BlackDiamond 8810 supports six power supply units. Use the command **show power budget** to view the distribution of power and available power on the switch. As shown in the following table, there are three power supply units and the total power available is 1968.00 Watts. The PoE module is in Slot 2.

```
BD8810.38 # show power budget
PS  State                                  Watts    48V      12V
-------------------------------------------------------------------------
 1  Powered On                            656.00   608.00    48.00
 2  Powered On                            656.00   608.00    48.00
 3  Powered On                            656.00   608.00    48.00
 4  Empty
 5  Empty
 6  Empty
-------------------------------------------------------------------------
Power Available:                        1968.00  1824.00   144.00
Redundant (N+1) Power Available:        1344.00  1248.00    96.00

Slots    Type            State          Watts    48V      12V
-------------------------------------------------------------------------
Slot-1  10G4X           Operational     106.00   105.00     1.00
Slot-2  G48P            Operational     106.00   105.00     1.00
  Inline Power (budgeted + 2% loss)     489.60   489.60     0.00
Slot-3  G48T            Operational     106.00   105.00     1.00
Slot-4  G24X            Operational     116.00   115.00     1.00
Slot-5  G8X             Operational       0.00     0.00     0.00
Slot-6                  Empty
Slot-7                  Empty
Slot-8                  Empty
Slot-9                  Empty
Slot-10                 Empty
MSM-A   MSM-G8X         Operational     151.00   150.00     1.00
MSM-B                   Empty           151.00   150.00     1.00
FanTray                 Operational      55.00    55.00     0.00
-------------------------------------------------------------------------
Power Required:                         1280.60  1274.60     6.00
Power Allocated:                        1280.60  1274.60     6.00
Power Surplus:                           687.40   549.40   138.00
Redundant Power Supply(s) Present?: NO
```

Use the command **enable/disable inline-power** to enable or disable inline power on the entire switch. Use the command **enable/disable inline-power slot <slotid>** to enable or disable inline power to a PoE slot. Use the command **configure inline-power budget <num_watts> slot <slotid>** to reserve the power budget for the PoE slot. In order to support 48 4620SW IP telephones on the G48P PoE module, it is recommended to configure 480 Watts budget for the module (10 Watts per port on average). Use the command **show inline-power** to display PoE status. The following table shows these configurations. The **power Usage Threshold** is


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configured to 70% by default. When the slot has consumed the power usage threshold, the switch will send an alarm. The **Usage Threshold** can be configured by the command **configure inline-power usage-threshold <threshold>**, which applies to each PoE slot on the switch.

```
BD8810.45 # enable inline-power

BD8810.46 # enable inline-power slot 2

BD8810.47 # configure inline-power budget 480 slot 2

BD8810.48 # show inline-power

                Inline Power System Information
Configured                  : Enabled
System Power Surplus        :  538 Watts available for budgeting
Redundant Power *SHORTFALL*:   27 Watts over budget to maintain N+1
Power Usage Threshold       : 70 percent (per slot)
Disconnect Precedence       : lowest-priority
                                        Budgeted       Measured
Slot  Inline-Power  Firmware Status     Power (Watts)  Power (Watts)   Legacy
2     Enabled       Operational         480 W          11 W            Disabled
```

Use the command **enable/disable inline-power ports <port_list>** to enable or disable inline power on the port listed. The BlackDiamond 8810 G48P module provides power to connected PDs at a default value of 15.4 Watts. The maximum power that can be delivered to a connected PD is 16.8 Watts. Use the command **show inline-power configuration ports <port_list>** to display the inline power configuration for the specified port(s). Note that the operator limit only applies to the non-standard PDs.

```
BD8810.56 # enable inline-power ports 2:1-48

*BD8810.57 # show inline-power configuration ports 2:1-48

Port   Config   Operator Limit   Priority   Label
2:1    Enabled     15400 mW      Low
2:2    Enabled     15400 mW      Low
2:3    Enabled     15400 mW      Low
2:4    Enabled     15400 mW      Low
2:5    Enabled     15400 mW      Low
2:6    Enabled     15400 mW      Low
2:7    Enabled     15400 mW      Low
…
```


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Use the command **show inline-power stats slot <slotid>** to show the inline power statistics of the specified slot.

```
BD8810.60 # show inline-power stats slot 2

Inline-Power Slot Statistics
Slot:  2
Firmware status                : Operational
Firmware revision              : 292b1

Total ports powered            : 3
Total ports awaiting power     : 45
Total ports faulted            : 0
Total ports disabled           : 0
```

Use the command **show inline-power stats port <portlist>** to show status for the specified port(s).

```
BD8810.65 # show inline-power stats  ports 2:1-48

                                STATISTICS COUNTERS
Port  State          Class     Absent  InvSig   Denied    OverCurrent   Short
2:1   delivering     class2         0       0        0              0       0
2:2   delivering     class2         0       0        0              0       0
2:3   delivering     class3         0       0        0              0       0
2:4   searching      ------         0       0        0              0       0
…
```

Use the command **show inline-power info detail ports <portlist>** to show the detailed port power configuration and status. The following display shows that Class 2 PDs (Avaya 4602SW on port 2:1 and 4610SW on port 2:2) are detected on ports 2:1-2:2, and a Class 3 PD (Avaya 4620SW) is detected on port 2:3. Note that the maximum allowed power is based on the detected classifications.


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```
BD8810.68 # show inline-power info detail ports 2:1-3

Port 2:1

Configured Admin State: enabled
Inline Power State    : delivering
MIB Detect Status     : delivering
Label                 :
Operator Limit        : 15400 milliwatts
PD Class              : class2
Max Allowed Power     : 7.0 W
Measured Power        : 3.200 W
Line Voltage          : 48.2 Volts
Current               : 64 mA
Fault Status          : None
Detailed Status       :
Priority              : low

Port 2:2

Configured Admin State: enabled
Inline Power State    : delivering
MIB Detect Status     : delivering
Label                 :
Operator Limit        : 15400 milliwatts
PD Class              : class2
Max Allowed Power     : 7.0 W
Measured Power        : 3.300 W
Line Voltage          : 48.3 Volts
Current               : 67 mA
Fault Status          : None
Detailed Status       :
Priority              : low

Port 2:3

Configured Admin State: enabled
Inline Power State    : delivering
MIB Detect Status     : delivering
Label                 :
Operator Limit        : 15400 milliwatts
PD Class              : class3
Max Allowed Power     : 15.400 W
Measured Power        : 5.300 W
Line Voltage          : 48.3 Volts
Current               : 109 mA
Fault Status          : None
Detailed Status       :
Priority              : low
```


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# 4. Interoperability Compliance Testing

This Interoperability Compliance Test included PoE testing between the Extreme Networks BlackDiamond 8810 and the Avaya 4600 Series IP telephones and Avaya Wireless Access Points.

## 4.1. General Test Approach

PoE test cases based on **Figure 1** were performed manually. PoE worked as expected for the test cases, including plugging/unplugging the Avaya PDs, enabling/disabling PoE on the switch, and resetting the switch.

## 4.2. Test Results

All test cases passed. No errors were detected. Extreme Networks BlackDiamond 8810 can provide inline power to the Avaya IP 4600 series IP telephones and Avaya Wireless Access Points successfully.

# 5. Support

Customers should call Extreme Networks Worldwide TAC when having problems related to Extreme Networks switches. Technical support is also available at the Extreme Networks web site at http://www.extremenetworks.com/services/wwtac/.

Product documentation for Extreme Networks can be downloaded via web at http://www.extremenetworks.com/services/documentation/.

# 6. Verification Steps

The following are verification steps for these Applications Notes:

- Connect Avaya IP telephones to the Extreme Networks BlackDiamond 8810. Verify that the Avaya IP telephones can be powered up properly.
- Verify that the Avaya IP telephones can register with Avaya Communication Manager and calls can be made successfully.
- Use the command **show inline-power info detail ports <portlist>** on the Extreme Networks BlackDiamond 8810 to check the power status.
- Reset the switch. Verify that all the IP telephones can be powered up properly.

# 7. Conclusion

Extreme Networks BlackDiamond 8810 was compliance tested with the Avaya IP 4600 Series telephones and Wireless Access Points for PoE. All PoE functionality test cases completed successfully. Extreme Networks BlackDiamond 8810 is IEEE 802.3af compliant and can provide inline power to the Avaya IP 4600 series IP telephones and Avaya Wireless Access Points.


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